

## DETAILED WORK PLAN

### **Protection of Downtown Santa Barbara Drinking Water and Surface Water Quality by Implementation of a Cleanup Prioritization Strategy**

The proposed project consists of six main tasks which will provide agencies involved in water quality and human health protection to more efficiently address existing and future threats to water quality in the City of Santa Barbara from polluted sites.

#### **TASK 1: COMPILE EXISTING DATA AND REPORTS RELATED TO POLLUTED SOIL, GROUNDWATER, AND SURFACE WATER**

The objective of this task is to **develop a comprehensive database including all publically available information on polluted media (soil, groundwater, and surface water), hydrogeologic and geologic information, and fate and transport of waste constituents.** All publically available information from state and local agencies related to waste constituents detected in groundwater, surface water, soil, or soil gas will be gathered, compiled and organized. This task is subdivided into 3 subtasks:

1. Establish a technical committee and a protocol for compiling water quality information
2. Gather, compile, organize, and input all data that may impact water quality into Geotracker<sup>1</sup>
3. Compile non-site related data in one database

This task will focus on information from files of public agencies including but not limited to the Santa Barbara County Fire Department (SBCFD), Central Coast Regional Water Quality Control Board (CCRWQCB), State Water Resources Control Board (SWRCB), Department of Water Resources (DWR), United States Geological Survey (USGS), Department of Toxic Substances Control (DTSC), City of Santa Barbara Parks and Recreation, City of Santa Barbara Public Works, County of Santa Barbara Public Works, County of Santa Barbara Planning and Development, and Santa Barbara County Environmental Health Department. Development of a public process for property owners, stakeholders, and other members of the public is discussed in Task 5.

#### **Task 1.1 Establish a technical committee and develop a protocol for compiling water quality information**

Task 1.1 will include convening and supporting a technical committee among agencies that manage issues related to water quality and develop a protocol for compiling water quality information for the downtown portion of the City of Santa Barbara (Figure 1). This process will include:

- a. Developing a list of contacts for all agencies and develop a technical committee that have and are interested in water quality and quantity information.
- b. Coordinating meetings with key technical staff from agencies that manage water quality and quantity information.
- c. Developing a protocol for sharing water quality information with water quality management and cleanup agencies.

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<sup>1</sup> See Project Description for GeoTracker description.

### **Task 1.2 Gather, compile, organize, and input all available water quality and relevant site data into GeoTracker**

Task 1.2 will include acquisition, organization, and inputting all available water quality related data into GeoTracker. The data included in the Geotracker database will conform to existing data format and fields. Specific work items will include:

- a. Create a master list of all cleanup sites, including historical and existing sites, that are located in the downtown area of Santa Barbara in GeoTracker, and all sites in public agency files (e.g., historical site evaluations) not included in GeoTracker.
- b. Using this master list, compile a list of all sites that are not yet entered in GeoTracker (including site background/address/Responsible Party information).
- c. Confirm site status in GeoTracker is correct for each site.
- d. Upload data to GeoTracker for all sites (from sources such as correspondence files, reports, latitude/longitude, electronic deliverable files from laboratories).
- e. Perform quality assurance/quality control (QA/QC) on data entered.

### **Task 1.3 Compile non-site related data in one database**

The focus of Task 1.3 is to create a comprehensive bibliography, electronic library, and to the extent feasible, a relational database containing general groundwater information for the basin underlying downtown Santa Barbara. The relational database would contain information that does not lend itself for inclusion in GeoTracker because it is not specific to a cleanup site. Specifically, the data inputted into the relational database would relate to factors associated with transport of pollution and potential public health risks. This could include aquifer characteristics, monitoring well data, soil data, soil gas data, and piezometric surface contours not directly related to existing cleanup sites (e.g., City monitoring well data, USGS evaluations, property transfer information, environmental site assessments (e.g., Phase I and II site assessments), complaint investigation information, data on significant chemical spills, etc.). This database will link the information collected to locations or areas described.

### **Task 1 Deliverables**

As a result of Task 1, the following deliverables will be produced:

- List of cooperating agencies and staff contact information.
- Organization chart for technical committee.
- Master list of all cleanup sites.
- Updated GeoTracker database.
- Summary of available non site-specific data.
- Data set including relevant basin characteristics and monitoring well data.
- Bibliography.
- Electronic library.

## **TASK 2: DEVELOPMENT OF GROUNDWATER BASIN CONCEPTUAL MODEL AND IDENTIFICATION OF EXPOSURE PATHWAYS AND RECEPTORS**

Task 2 will result in development of an overall groundwater basin conceptual model that will compile existing information to enhance the current understanding of fate and transport of pollutants in the Santa Barbara groundwater basin. Task 2 will also provide a better understanding of the pollutants of concern in Santa Barbara and the risk these pollutants pose to the environment and public health. Specifically, there will be a compilation and evaluation of

existing data sources (e.g., hydrogeologic characteristics, general geologic and geomorphic features, available fate and transport information, groundwater flow direction, aquifer parameters, infiltration rates, exposure pathways and receptors, soil and groundwater pollutant information) to develop a diagram of the Santa Barbara groundwater basin that conceptually shows the hydrogeologically vulnerable areas and receptors. The analysis of existing information will focus on the relationship and transport mechanisms between the surficial soils and shallow groundwater to the deeper drinking water aquifer and surface water.

### **Task 2.1 Compile Available Hydrogeologic and Geologic Characteristics**

The purpose of this task is to compile available hydrogeologic and geologic information to understand overall groundwater basin characteristics. This task will compile the following information from available data sources:

- Geologic and geomorphic features of the downtown Santa Barbara area. For example confining layer thickness and permeability, etc.,
- Groundwater flow direction information. For example, obtain and update as necessary typical groundwater contour maps for hydrogeologic units of interest,
- Review existing hydrogeologic models for the basin,
- Compile available aquifer parameters: hydraulic conductivity, hydraulic gradient, aquifer thickness, pump test data, well logs, porosity, soil data, etc.,
- Compile existing information to determine general characterization of groundwater and surface water chemistry (dissolved general minerals [Piper-Stiff diagrams], isotopes, etc.) to augment the evaluation of pollutant transport,
- Evaluate historical groundwater elevation hydrographs and horizontal/vertical gradients, and depth to water. Review existing contour maps for shallow groundwater and piezometric surface maps of the deeper aquifer,
- Compile and evaluate soils, geology, and hydrogeology to provide a framework further characterize groundwater/surface water interaction and groundwater movement, and
- Compile infiltration rate and meteorologic parameter information.

### **Task 2.2 Develop a List of Pollutants of Concern**

Some of the typical pollutants of concern identified at cleanup sites are volatile organic compounds including tetrachloroethene (PCE), trichloroethene (TCE), and their daughter products; total petroleum hydrocarbons (TPH); methyl tertiary butyl ether (MTBE); benzene, toluene, ethylene, xylenes (BTEX); and lead, as the main pollutants of concern in the downtown Santa Barbara area. Task 2.2 will consist of compiling a list of all pollutants of concern and a detailed review of pollutant information collected in Task 1 and comparing these pollutant concentrations to human health and ecological screening values. This task will develop a list of pollutants that will be used for further project analysis and cleanup prioritization efforts.

### **Task 2.3 Identify Potential Pathways and Receptors Specific to Santa Barbara**

Based on available information, this sub-task will identify pathways and receptors that are, or could be, at risk from soil and shallow groundwater pollution (e.g., from sites/areas identified in Task 1) in Santa Barbara. Potential receptors currently include: a) deep drinking water aquifer, b) surface water bodies, and c) indoor air. The approach for evaluating these receptors is included below:

#### ***Drinking Water Receptor:***

- Obtain drinking water well information (e.g., location maps and well logs from GeoTracker GAMA, City, and Department of Water Resources).

- Upload well logs to Geotracker, if they are not already available. Ensure confidentiality of supply well location is maintained.
- Compile drinking water quality data from wells in downtown area.
- Use aquifer characteristics and information identified in Task 2.1 to identify potential drinking water receptors.

***Surface Water/Aquatic Life Receptor:***

- Obtain maps of surface water bodies (creeks and ocean) and stormwater collection and discharge system.
- Compile any surface water quality data.
- Compile information on areas of groundwater discharge to surface water bodies.

***Indoor Air:***

- Obtain land use maps and records of soil gas and sub-slab air quality.
- Compile available data related to background (outdoor) air sampling from Air Pollution Control District (APCD) and cleanup sites.

**Task 2.4 Identify Fate and Transport Mechanisms**

This sub-task will identify and generally characterize pathways from polluted soils and shallow polluted groundwater to receptors identified in Task 2.3. Specifically, this sub-task will include compiling and reviewing existing hydrogeologic data to determine potential pathways from soils to shallow groundwater aquifer, groundwater to soil vapor, and shallow groundwater to deeper aquifer or surface water. This information will then be used to create maps of the receptors relative to the available pollutant information in GeoTracker. These maps will be based on data collected and compiled in Tasks 1 and 2. This task will:

- Map wellhead protection zones/areas.
- Map hydrologically vulnerable areas such as recharge areas where shallow pollution may reach drinking water wells, areas where there is not a good separation (aquitar) between shallow and deep aquifer, and areas where polluted groundwater potentially discharges to creeks/ocean.
- Use existing maps to identify general areas that may exceed screening standards for risk from vapor intrusion based on groundwater data.
- General soil gas and/or groundwater concentration and depth data compared to land use.
- General groundwater concentration data compared to recharge areas/near creeks/close to storm drains.
- Shallow groundwater concentration data near drinking water wells.

**Task 2.5 Develop a Conceptual Groundwater Basin Model including Sources, Receptors, and Significant Pathways**

The data collected in Task 2.1 through 2.4 will be summarized and used to develop a general diagram that shows a conceptual model of the groundwater basin within the downtown Santa Barbara area to better understand the relationship among sources of groundwater, groundwater discharge, subsurface flow direction, drinking water wells, creeks, ocean, and other sensitive receptors. In order to later prioritize existing cleanup sites, or areas that need further investigation, maps of the general locations most vulnerable to pollutants will be prepared.

## **Task 2 Deliverables**

As a result of Task 2, the following deliverables will be produced:

- A summary of general hydrogeology and geology groundwater basin information.
- List of pollutants of concern and site locations.
- A database containing the location of critical receptors.
- A summary of transport mechanisms.
- Diagram showing conceptual model of the groundwater basin.
- Maps of the general locations most vulnerable to pollutants.

## **TASK 3: RANK/PRIORITIZE OPEN CLEANUP SITES**

Task 3 will outline specific criteria for ranking and prioritizing cleanup sites. Site ranking and prioritization will be used to assist regulatory agency staff with work prioritization and work assignment distribution to ensure the highest priority sites are worked on. The prioritization strategy will expedite cleanup of polluted sites relative to critical receptors as well as identify areas requiring further investigation. The process will be accomplished in two steps: development of prioritizing criteria and application of the criteria to establish which cleanup sites are highest priority for cleanup.

### **Task 3.1 Develop Ranking and Prioritization Criteria**

By developing appropriate prioritization criteria and identifying the highest priority groundwater and/or soil vapor sites due to groundwater pollution, agency staff can focus their efforts at those sites that require the most immediate attention to ensure protection of water quality and human/environmental health. This sub-task will result in a list of criteria for regulatory agencies to use in prioritizing and ranking their cleanup sites to ensure risk to the environment and human health is reduced as efficiently and effectively as possible. This sub-task will rely on the information gathered in Task 1 and 2. The list of prioritization criteria will consider the following:

- Risk to human health and the environment,
- Site hydrogeologic and pollutant complexity,
- Technical and economic feasibility, and
- Level of public education, notification, and outreach required for a particular site cleanup.

### **Task 3.2 Compare Rankings and Develop an Action Plan**

This sub-task will focus on application of the criteria developed in Task 3.1. First the criteria developed in Task 3.1 will be applied for polluted and potentially polluted sites identified in Task 1.2. Agencies will then compare their current project priorities and cleanup efforts to the rankings developed in Task 3.1 and adjust their work priorities according to the prioritization criteria. To address any discrepancies between the existing priorities list and the list developed through application of the rankings, this task will include development of a proposed action plan to:

- a. address discrepancies between rankings and ongoing cleanup efforts at polluted sites;
- b. identify approaches to address pollution that cannot be assigned to a responsible party; and
- c. identify agency responsible for implementing plan elements on each site.

### **Task 3 Deliverables**

As a result of Task 3, the following deliverables will be produced:

- Final site ranking criteria.
- List of sites ranked according to criteria.
- Action Plan.

## **TASK 4: IDENTIFY DATA GAPS AND RECOMMEND IMPROVED MONITORING**

Task 4 will identify if ongoing monitoring is adequate to track existing pollution to document adequate cleanup efforts. Specifically, existing monitoring efforts will be evaluated to identify any significant gaps in existing monitoring.

This task will use existing hydrogeologic, groundwater quality, and surface water quality data to identify potentially polluted areas that require additional monitoring and assessment for the protection of drinking water, surface water, and/or indoor air. This analysis will include consideration of monitoring necessary to document abatement at existing sites as well as monitoring to assess concerns identified during development of the groundwater basin conceptual model. This task will also consider where ongoing site monitoring will no longer be available due to site cleanup closures/well abandonment. This information will be summarized in the final report.

### **Task 4 Deliverables**

As a result of Task 4, the following deliverables will be produced:

- Technical memorandum describing significant gaps in existing data collection and recommendations for additional monitoring efforts.

## **TASK 5: IMPROVE PUBLIC OUTREACH AND UNDERSTANDING**

Establish a public stakeholder process. Two meetings will be held: the first to share the purpose and scope of the study, the second to present results.

### **Task 5 Deliverables**

As a result of Task 5, the following deliverables will be produced:

- Meeting materials including agendas, presentation materials, and meetings notes.
- List of participating stakeholders.

## **TASK 6: PREPARE TECHNICAL SUMMARY REPORT**

A draft report will be developed and provided to agencies and stakeholders for comments. After comments are reviewed, a final report will be prepared. The Report will incorporate deliverables from Tasks 1 through 5

### **Task 6 Deliverables**

As a result of Task 6, the following deliverables will be produced:

- Draft Report
- Final Report

## **TASK 7: PROJECT MANAGEMENT**

The final scope, budget, and timeline will be incorporated into a contract with the Department of Water Resources. Subsequently, periodic reports will be prepared and submitted as stipulated in the local groundwater assistance contract.

### **Task 7 Deliverables**

As a result of Task 7, the following deliverables will be produced:

- Executed contract between County and Department of Water Resources.
- Periodic reports as stipulated in the local groundwater assistance contract.